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Physiological Responses of *Fagus sylvatica* and *Quercus robur* Seedlings to Light Intensity

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Broadleaf planting has become increasingly important in Ireland over the recent years and light is recognised as one of the main environmental factors affecting stand development, but to date there has been little research on broadleaf responses to light intensity, particularly in Ireland. Continuous cover forestry (CCF) is increasing as an alternative to clear-cutting and uses the control of light to produce plantation benefits. The physiological responses of beech (*Fagus sylvatica*) and oak (*Quercus robur*) seedlings to four different shade environments (100%, 62%, 51% and 28% of incident photosynthetically active radiation, PAR) were studied in a shadehouse experiment during the summer of 2013.

Light-response curves (only measured in the extreme treatments) differed between beech seedlings of the Control treatment (PAR=100%) and those of the heavy shade treatment (PAR=28%) when PAR > 100 $\mu\text{mol m}^{-2} \text{s}^{-1}$, while there was little difference for oak between both treatments. Light-response curves generally showed maximum photosynthetic rates (A_{max}) at 1500 $\mu\text{mol m}^{-2} \text{s}^{-1}$ in both treatments, and this PAR value was used while measuring stomatal conductance (g_s) and water use efficiency (WUE). Significantly higher values of A_{max} and g_s were found in oak than in beech in the 62%, 51% and 28% treatments. There were no significant differences between oak and beech for A_{max} and g_s in the Control treatment or for WUE in the four treatments.